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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/575,354	04/11/2006	Maurizio Crozzoli	05788.0396	9360

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EXAMINER	
HSIEH, PING Y	

ART UNIT	PAPER NUMBER
2618	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/575,354	CROZZOLI ET AL.	
	Examiner	Art Unit	
	Ping Y. Hsieh	2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 April 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *33-64* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *33-64* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 April 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/11/06 and 5/11/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 64 is rejected under 35 U.S.C. 101 because it appears to be directed toward a computer program product which is not patentable eligible subject matter. Any computer executable software code must be stored in a computer readable storage medium to enable the underlying functionality. A structural and functional interrelationship between the computer program and the structural elements of the computer, which would permit its functionality to be realized, should be included in the claim. An example of acceptable language under 35 U.S.C. 101 would be "a computer readable medium storing a computer program...".

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 33-36, 38-54 and 52-64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Judd et al. (U.S. PG-PUB NO. 2003/0032424) in view of Ylitalo (U.S. PATENT NO. 7,203,519).

-Regarding claims 33 and 64, Judd et al. disclose a method for configuring the radiation characteristics of an antenna **(as disclosed in Fig. 4 and further disclosed in paragraph 44)**, comprising the steps of: including in said antenna a plurality of radiating elements **(M columns of antenna structure as disclosed in Fig. 4)**; associating to each of said radiating elements at least a respective signal processing chain **(N array elements as disclosed in Fig. 3 and 4 and further disclosed in paragraph 44)**, including in said respective chain: at least one antenna conversion set interposed between digital mux s and one of the radiating elements of the antenna **(A/D converter 106 and D/A converter 118 interposed between digital mux 108 and one of the radiating elements of the antenna as disclosed in Fig. 4)**, said antenna conversion set being configured to operate on digital signals on the side of digital mux and on analogue signals on the side of the antenna element **(see Fig. 4 and paragraph 46)**. However, Judd et al. fails to disclose at least one module for weighting digital signals capable of applying to a digital signal at least a respective weighting coefficient, and causing the propagation of a signal distributed on the

processing chains associated to said plurality of radiating elements of the antenna by applying respective weighting coefficients to said digital signal weighting modules, said weighting coefficients determining the radiation diagram of the antenna.

Ylitalo discloses at least one module for weighting digital signals capable of applying to a digital signal at least a respective weighting coefficient **(weighting means 306 as disclosed in Fig. 3 and further disclosed in col. 4 lines 4-7)**, and causing the propagation of a signal distributed on the processing chains associated to said plurality of radiating elements of the antenna by applying respective weighting coefficients to said digital signal weighting modules, said weighting coefficients determining the radiation diagram of the antenna **(see col. 10 lines 4-18)**.

Therefore, it would have been obvious to one of ordinary skills in the art at the time of invention to modify the weighting means 306 as disclosed by Ylitalo to be incorporated with the antenna as disclosed by Judd et al. at the digital IF signal 103 as disclosed in Fig. 4. One is motivated as such in order to provide a more efficient frequency reuse by directing the antenna beams in the digital phasing of a complex vector form.

-Regarding claim 47, Judd et al. disclose an antenna with configurable radiation characteristics **(as disclosed in Fig. 4 and further disclosed in paragraph 44)**, comprising: a plurality of antenna radiating elements; and associated to each of said radiating elements **(M columns of antenna structure**

as disclosed in Fig. 4), at least a respective signal processing chain **(N array elements as disclosed in Fig. 3 and 4 and further disclosed in paragraph 44)**, the processing chain in turn comprising: at least one antenna conversion set interposed between digital mux and one of the radiating elements of the antenna **(A/D converter 106 and D/A converter 118 interposed between digital mux 108 and one of the radiating elements of the antenna as disclosed in Fig. 4)**, said antenna conversion set being configured to operate on digital signals on the side of said respective weighting module and on analogue signals on the side of the antenna element **(see Fig. 4 and paragraph 46)**. However, Judd et al. fails to disclose at least one digital signal weighting module capable of applying to a digital signal at least a respective weighting coefficient, and the arrangement being such that the weighting coefficients applied to said digital signal weighting modules determine the radiation diagram of the antenna.

Ylitalo discloses at least one module for weighting digital signals capable of applying to a digital signal at least a respective weighting coefficient **(weighting means 306 as disclosed in Fig. 3 and further disclosed in col. 4 lines 4-7)**, and causing the propagation of a signal distributed on the processing chains associated to said plurality of radiating elements of the antenna by applying respective weighting coefficients to said digital signal weighting modules, said weighting coefficients determining the radiation diagram of the antenna **(see col. 10 lines 4-18)**.

Therefore, it would have been obvious to one of ordinary skills in the art at the time of invention to modify the weighting means 306 as disclosed by Ylitalo to be incorporated with the antenna as disclosed by Judd et al. at the digital IF signal 103 as disclosed in Fig. 4. One is motivated as such in order to provide a more efficient frequency reuse by directing the antenna beams in the digital phasing of a complex vector form.

-Regarding claims 34 and 48, the combination teaches all the limitations as claimed in claims 33 and 47. Even thought the combination fails to specifically disclose further discloses said signal processing chains comprise first and second digital signal weighting modules as well as first and second antenna conversion sets, said first weighting modules and antenna conversion sets operating on a signal propagated toward said radiating elements of the antenna, said second weighting modules and antenna conversion sets operating on a signal propagated starting from said radiating elements of said antenna, It would have been obvious to one of ordinary skills in the art at the time of invention to modify a first weighting means 306 to be incorporated with the processing chain as disclosed by Judd et al. between the A/D converter 106 and digital mux 108 as disclosed in Fig. 4 and a second weighting means 306 to be incorporated with the antenna as disclosed by Judd et al. between the A/D converter 118 and digital mux 108 as disclosed in Fig. 4. One is motivated as such in order to provide a more efficient frequency reuse by directing the antenna beams in the digital phasing of a complex vector form.

-Regarding claims 35, 36, 49 and 50, the combination further discloses at least one weighting control block configured to apply to said first weighting modules and said second weighting modules weighting coefficients wherein said radiation diagram applied by said antenna to said signal is equal both or different for the signal propagated toward said antenna and for the signal propagated starting from said antenna **(Ylitalo, the weighting coefficients are selected according to a typically adaptive algorithm in such a way that the desired radiation pattern is achieved as disclosed in col. 10 lines 4-18)**.

-Regarding claims 38 and 52, the combination further discloses at least one frequency converter operating between the radio frequency and the intermediate frequency **(see Judd et al., paragraph 45)**.

-Regarding claims 39 and 53, the combination further discloses said first and second antenna conversion sets are associated signal distribution elements capable of operating both on a signal propagated toward said antenna and on a signal propagated starting from said antenna **(Judd et al., as disclosed in Fig. 4)**.

-Regarding claims 40 and 54, the combination further discloses said signal distribution elements are selected from the group of radio frequency duplexers and switches **(Judd et al., frequency multiplexer 90 as disclosed in Fig. 4 and further disclosed in paragraph 45)**.

-Regarding claims 41 and 55, the combination further discloses a distributing element configured to: generate a plurality of replications of a signal

to be fed toward said antenna; and sending said replications of the signal on respective processing chains associated to said radiating elements of the antenna **(Judd et al., a receive and transmit signal will be generated for each of the antenna columns 1-m as disclosed in Fig. 4 and further disclosed in paragraph 46)**.

-Regarding claims 42 and 56, the combination further discloses a collecting element configured to collect the component of a signal received starting from said antenna and distributed on said processing chains associated to said radiating elements of the antenna **(Judd et al., bracket 42 as disclosed in Fig. 4 and further disclosed in paragraph 45)**.

-Regarding claims 43 and 57, the combination further discloses an extraction module configured to extract said weighting coefficients in view of the application to said weighting modules starting from said signal **(Ylitalo, it is inherent for the control block 320 to extract said weighing coefficients as disclosed in col. 10 lines 4-18)**.

-Regarding claims 46 and 58, the combination further discloses said processing chains associated to said radiating elements of the antenna are located in close proximity to the antenna itself **(Judd et al., as disclosed in Fig. 4)**.

-Regarding claims 44 and 59, the combination further discloses the antenna is associated to: an electro-optical converter module configured to convert the signal, that propagates on said processing chains associated to said

radiating elements of the antenna, between an optical format and an electrical format **(Judd et al., digital to fiber converter 60 as disclosed in Fig. 4 and further disclosed in paragraphs 38 and 46)**.

-Regarding claims 45 and 60, the combination of Judd et al. and Ylitalo discloses all the limitations as claimed in claims 47 and 59. Even thought the combination fails to specifically disclose said electro-optical converter module has associated therewith an extraction module configured to extract said weighting coefficients in view of the application to said weighting modules starting from said optical signal, it would have been obvious to one of ordinary skills in the art at the time of invention to modify the digital to fiber converter 60 as disclosed by Judd et al. to include the control block 320 to extract said weighting coefficients. One is motivated as such in order to provide a more efficient frequency reuse by directing the antenna beams in the digital phasing of a complex vector form.

-Regarding claim 61, the combination further discloses a control unit and an optical link for the transmission of an optical signal between said control unit and said electro-optical converter module associated to said antenna **(Judd et al., as disclosed in paragraph 40)**.

-Regarding claim 62, the combination further discloses said control unit comprises a function block that is able to generate an information signal and a signal for controlling the radiation diagram of the antenna **(Judd et al., as disclosed in paragraph 40)**.

-Regarding claim 63, the combination further discloses a telecommunications network comprising at least an antenna as claimed in claim 47 **(Judd et al., as disclosed in paragraph 2)**.

5. Claims 37 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Judd et al. (U.S. PG-PUB NO. 2003/0032424) in view of Ylitalo (U.S. PATENT NO. 7,203,519) and further in view of Wang et al. (U.S. PATENT NO. 7,257,425).

-Regarding claims 37 and 51, the combination of Judd et al. and Ylitalo discloses all the limitations as claimed in claim 47. However, the combination fails to disclose said antenna conversion set comprises at least one frequency converter operating between the radio frequency and the base band.

Wang et al. disclose a RF processor 17 downconverts received RF signals for baseband processing as disclosed in col. 6 lines 15-22.

Therefore, it would have been obvious to one of ordinary skills in the art at the time of invention to modify the antenna as disclosed by Judd et al. and Ylitalo to include a RF processor 17 in order to downconvert RF to base band. One is motivated as such in order to decrease the bandwidth.

Conclusion

2. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Hoppenstein (U.S. PATENT NO. 7,280,848).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ping Y. Hsieh whose telephone number is 571-270-

3011. The examiner can normally be reached on Monday-Thursday (alternate Fridays) 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lana Le can be reached on 571-272-7891. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PH

12-24-07

LANA LE
PRIMARY EXAMINER